



## Industry, Academia, and Government Working Together

Industry and academia have a symbiotic relationship. Industry looks to academia for qualified candidates to add to its workforce, while educational institutions recruit the brightest minds with the promise of gainful employment. Curricula are often altered and customized to prepare students for challenges after graduation and to suit the needs of industry. Academic research impacts industry, and in some cases, receives funding from companies.

Despite these interconnections, a gap exists between the two due to differences in their approaches, missions, and customers. To bridge the gap, companies and academic institutions have been collaborating more closely on research to identify mutual benefits. Government entities have also begun to help fund, educate, and provide a framework for projects to help strengthen these partnerships.

Companies are using academic labs as incubators for long-term and exploratory research. Academic incubators are strategic areas designed by schools to promote entrepreneurship, innovation, and research. The incubators are spaces for exchanging new ideas and collaborating on projects, as well as effective tools for workforce development. Industry can look to the startups and research projects developed in these incubators as valuable investment opportunities.

Government entities, such as the National Science Foundation (NSF), U.S. Dept. of Defense (DOD), U.S. Dept. of Energy (DOE), National Institute of Standards and Technology (NIST), and National Institutes of Health (NIH), are sponsoring research that promotes collaboration and partnership between industry, academia, and federal labs. These initiatives aim to gather resources and expertise from diverse sources to tackle society's most pressing challenges. Each agency has a multitude of programs that promote collaboration, as well as serve their own sets of needs and regulations.

Government agencies promote, fund, or facilitate partnerships in many ways:

- *Research partnership agreements* are collaborative efforts on research projects between two or more institutions. These projects can be for exploratory purposes, targeted for a specific task, or to produce a marketable product.
- *Resource use agreements* enable collaboration by sharing resources such as laboratory facilities or equipment. These agreements are usually for shorter-term projects for which it is more practical for one or more of the parties to

borrow or use readily available equipment, rather than build or buy their own, which can be costly and time-consuming.

- *Personnel exchange agreements* allow staff to work either specifically on a given project or freely between collaborators. The value of this type of agreement is that it capitalizes on the specialized expertise of personnel to assist in multiple projects to maximize their value.

- *Educational agreements* develop programs that educate personnel in a way that satisfies the missions of all parties involved. Examples of this are fellowships, internships, co-ops, and training programs designed to help those involved gain valuable experience that they otherwise would not have had the opportunity to obtain.

- *A consortium* brings together a group of institutions to pool their research and expertise to tackle an issue that would be beyond the scope of any one member.

A recent example of a consortium is the National Cancer Moonshot Initiative. Congress passed the 21st Century Cures Act in 2016, which pledged \$1.8 billion in funding for cancer research through the Moonshot Initiative. The initiative is administered by the NIH and encourages the active collaboration of a host of institutes from industry, academia, and government laboratories to pool resources and expertise to find a cure for cancer. The initiative has an open-access policy to promote the free flow of information and data between participants.

Other examples of consortia include the Carbon Capture Simulation Initiative (CCSI), which aims to expedite the growth of carbon capture technologies; the Joint Bioenergy Institute (JBEI), which pertains to the development of biofuels; and the Critical Materials Institute (CMI), which focuses on making better use of available materials.

Sometimes, independent organizations are formed to address a gap in a field with needs that are not being met by existing collaborations. The Council for Chemical Research (CCR) is one such organization that was formed to foster collaborations within the chemical research enterprise. For more than 35 years, CCR has promoted networking and partnerships among key leaders of academic, industrial, and governmental chemical research. CCR has fostered a network for collaborating, sharing ideas, and identifying new research through meetings, workshops, and white papers. Beginning in 2016, CCR's operations have been under the auspices of AIChE. To learn more about CCR and upcoming events, visit [www.ccrhq.org](http://www.ccrhq.org).

CEP